Advanced Research Projects Agency • ENERGY

BEEST PROJECT

PELLION TECHNOLOGIES

RECHARGEABLE MAGNESIUM BATTERIES

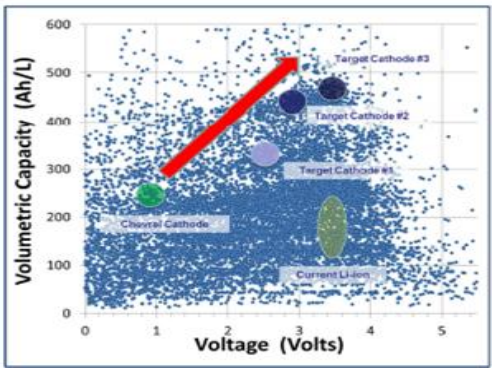
PROJECT TITLE:	Low-Cost Rechargeable Magnesium Batteries with High Energy Density		
ORGANIZATION:	Pellion Technologies, Inc.	LOCATION:	Cambridge, MA
PROGRAM:	BEEST	ARPA-E AWARD:	$3,204,080
TECH TOPIC:	Energy Storage: Portable	PROJECT TERM:	10/1/10 – 10/1/12
WEBSITE:	www.pelliontech.com		

CRITICAL NEED

Most of today's electric vehicles (EVs) are powered by lithium-ion (Li-Ion) batteries—the same kind of batteries used in cell phones and laptop computers. Currently, Li-Ion batteries have a driving range limited to 100 miles on a single charge and account for nearly 65% of the total cost of EVs. To compete in the market with gasoline-based vehicles, EVs must cost less and drive farther. An EV that is cost-competitive with gasoline would require a battery with twice the energy storage of today's state-of-the-art Li-Ion battery at 30% of the cost.

PROJECT INNOVATION + ADVANTAGES

Pellion Technologies is developing rechargeable magnesium batteries that would enable an EV to travel 3 times farther than it could using Li-ion batteries. Prototype magnesium batteries demonstrate excellent electrochemical behavior; delivering thousands of charge cycles with very little fade. Nevertheless, these prototypes have always stored too little energy to be commercially viable. Pellion Technologies is working to overcome this challenge by rapidly screening potential storage materials using proprietary, high-throughput computer models. To date, 12,000 materials have been identified and analyzed. The resulting best materials have been electrochemically tested, yielding several very promising candidates.



IMPACT

If successful, Pellion Technologies will develop an EV battery that delivers 200% more energy, lasts for thousands of charge and discharge cycles, and costs less than conventional Li-ion batteries.

- SECURITY: Increased use of EVs would decrease U.S. dependence on foreign oil—the transportation sector is the dominant source of this dependence.
- ENVIRONMENT: Greater use of EVs would reduce greenhouse gas emissions, 28% of which come from the transportation sector.
- ECONOMY: This battery would enable an EV to travel from Chicago to St. Louis (300 miles) on a single charge, for less than $10 on average.
- JOBS: This project would help position the U.S. as a leader in rechargeable battery manufacturing. Currently, the U.S. manufactures only a small percentage of all rechargeable batteries, despite inventing the majority of battery technologies.

CONTACTS

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